"You Don't Need to Test COTS Components" and Other Myths

Weighing the T&E Benefits and Risks for Commercial and Nondevelopmental Items

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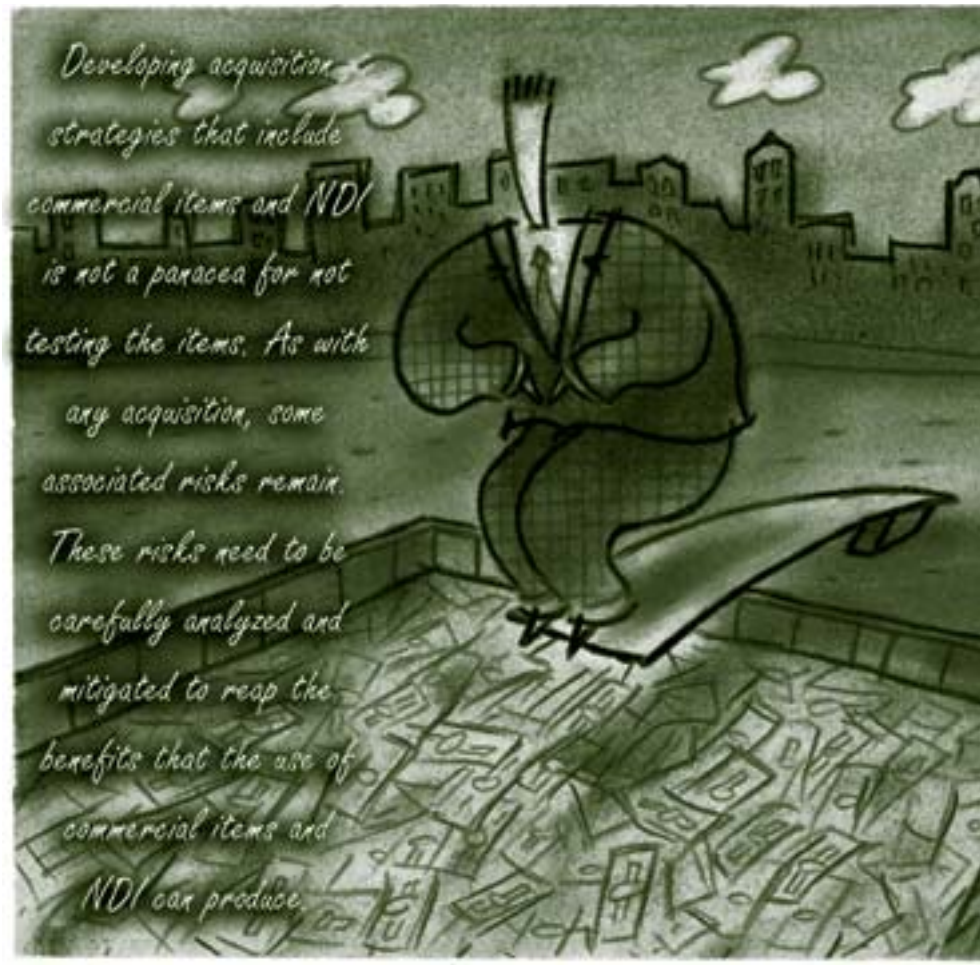
Imagine yourself as the program manager for a new acquisition. The contractor's proposal includes use of commercial and nondevelopmental items (NDI). Your test engineer is concerned about the implications of incorporating these items into the overall system. Will there be test and evaluation (T&E)? If so, what kind? How extensive should the tests be? Your T&E concerns will need to be incorporated into the applicable acquisition strategy and Test & Evaluation Master Plan (TEMP) documents. Before developing your acquisition strategy though, you must weigh the T&E benefits and risks of using these items. This article highlights some examples of the benefits and risks for T&E considerations, particularly for acquisition strategies that include commercial items and NDI.



By Law

First, understanding what commercial items and NDI *are* is important to understanding *why* we need to consider them in developing our acquisition strategies. From there, we can examine the implications on the T&E community.

The Federal Acquisition Regulation (FAR) Part 2.1 defines a commercial item as:

> "Any item, other than real property, that is of a type customarily used for nongovernmental purposes and that (1) has been sold, leased, or licensed to the general public; or, (2) has been offered for sale, lease, or license to the general public."

The item can be evolved from a commercial item but not yet available for the commercial market. It can also be modified as long as it does "not significantly alter the nongovernmental function or essential physical characteristics of an item or component, or change the purpose of a process."

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A commercial item is NDI, "if the procuring agency determines the item was developed exclusively at private expense and sold in substantial quantities, on a competitive basis, to multiple State and local governments."

Title VIII of the Federal Acquisition Streamlining Act (FASA) of 1994 (Public Law 103-355) implemented the Federal Government's preference for the acquisition of commercial items. According to FAR 12.1, it also established acquisition policies "more closely resembling those of the commercial marketplace…."

Business Environment

In their article entitled, "Solutions: Opportunities and Obstacles," published in the March 2001 issue of *The Edge Perspectives*, J. Clapp, A. King, and A. Taub state that the "commercial sector has reorganized, restructured, and adopted revolutionary new business and management practices in order to ensure its competitive edge in the rapidly changing global marketplace."

DoD, by way of new laws enacted and senior leadership policies in support of acquisition streamlining, has responded to this shift as well. In the 1997 *Report of the Quadrennial Defense Review*, former Secretary of Defense William Cohen stated that DoD must adapt to this new marketplace. This adaptation has represented a major operational and business paradigm shift from a customized, proprietary model to a commercial, open market model. As a result, the T&E community has actively responded to these changes, providing policy, guidance, lessons learned, and best practices to aid in T&E of commercial items and NDI.

Policy

DoD 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, updated in June 2001, states that:

> "T&E on commercial and nondevelopmental items shall ensure performance operational effectiveness, and operational suitability for the military application in the military environment, regardless of the manner of procurement. Test planning for these items shall recognize commercial testing and experience, but nonetheless determine the appropriate DT&E [Developmental Test & Evaluation], OT&E [Operational Test & Evaluation], and LFT&E [Live Fire Test & Evaluation] needed to assure effective performance in the intended operational environment."

Misconceptions

When FASA was enacted, the use of commercial items and NDI was expected to result in acquisitions that were significantly faster, better, and cheaper. Since the items were already developed, there really wasn't a reason to conduct further systems engineering or testing. These misconceptions are still there today.

The U.S. Air Force Scientific Advisory Board recently completed a report on the successful implementation of Commercial Items in Air Force Systems. During their interviews, which encompassed 34 programs and organizations, they uncovered a common myth, namely: "You don't need to test COTS [Commercial Off-the-Shelf] components." But as noted in DoD 5000.2R cited earlier, T&E is still required to ensure that the item will perform its intended military application. As the program manager, you might want to consider, when developing your own acquisition strategy, some of the following benefits and risks associated with T&E of commercial items and NDI:

Benefits for T&E of Commercial Items and NDI

- Government need for testing is reduced since commercial market has already accomplished functional testing.
- Government can access commercial market testing results to expedite integration and interoperability testing.
- Government can readily obtain the usage and failure data of products already in use (defects should have already been detected and eliminated).
- Government may observe contractor testing instead of conducting new tests.
- Test articles are readily available to the government since they are already in the commercial market.
- Testing is at black box level (no need for developmental white box testing).
- Upgrades to existing items are tested by the commercial market before release.

Risks for T&E of Commercial Items and NDI

- Complete commercial testing may not have debugged everything (may not work as advertised, and may require further testing).
- According to author A. King in an article entitled, "COTS Commercial Off-the-Shelf, Benefits and Burdens," published in the March 2001 issue of *The Edge Perspectives*, Black box testing only allows government to "make inferences about the product by observing component behavior."
- Authorization and privacy risks (may have embedded "Trojan horse").
- Still need to thoroughly test item to performance specifications as part of the integrated system.
- Legacy system risks. (After numerous upgrades, commercial vendor may decide to no longer support the item and may need to substitute or modify it, which will require further testing.)
- Lack of control over schedule of upgrades means mandatory testing of all interfaces again to ensure they still perform.
- Item may have too many functional capabilities and can interfere with system performance once integrated.
- Reliability tests may not have been enough for military application and may require further testing.
- Evolution of system development means item may not be static, and tests conducted may not be conducted on the exact equipment/systems fielded.
- Planning, Programming, and Budgeting System may hinder planning for T&E funds for shortened acquisition cycles.

- Modifications to items can result in further testing since item has moved from the original tested baseline.
- Environmental testing may not meet all military specifications.
- Safety testing may not be adequate for military application.
- Commercial market may be unwilling to provide description of testing performed.

Counting the Cost

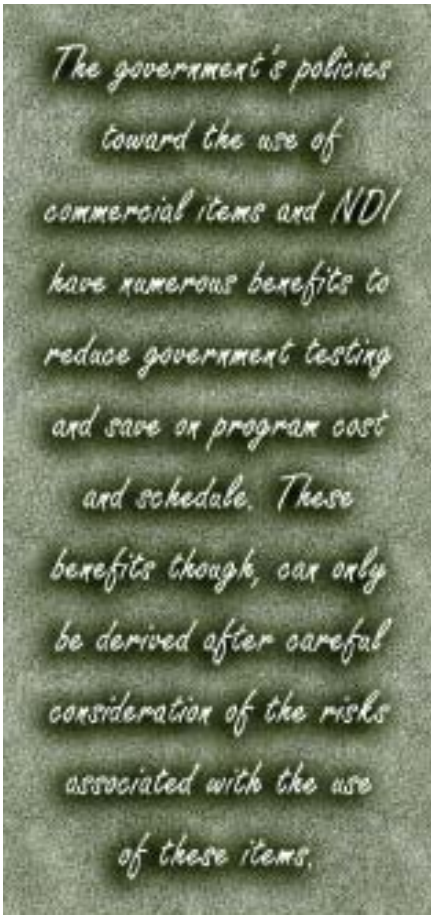
As you can see, the government's policies toward the use of commercial items and NDI have numerous benefits to reduce government testing and save on program cost and schedule. These benefits though, can only be derived after careful consideration of the risks associated with the use of these items. For T&E, that means early involvement in the process, beginning with the initial market research.

During market research, as items are identified as potential candidates, the T&E community can analyze them in the context of the associated risks listed in this article. Questions to ask could include:

- What type of testing has been completed?
- What were the conditions?
- What would be required for integration into the current system?
- How are upgrades tested, and how will this information be obtained?

With this information, the T&E community can adequately prepare an analysis on the benefits and risks associated with the acquisition. They can use this analysis to propose test implications for cost, schedule, and performance risk to the program. The program manager can then use the T&E risks, along with other program risks, to make an informed decision on whether to use commercial items or NDI, and if so, which ones to use.

Since the goal of using commercial items and NDI, as stated in the March 1998 *Test and Evaluation Management Guide*, published by the Defense Systems Management College, is to "reduce acquisition time," it is important that any proposed testing not be redundant and that it be limited to the minimum effort necessary to obtain the required data.



Careful thinking and planning is key. Draft versions of the TEMP should focus on the minimum testing necessary to verify integration and interoperability with other system elements in the operational environment where its use is intended. This type of testing is especially important since the commercial development environment might be significantly different than the military environment—a situation noted in a 1997 DoD Inspector General Report (97-219), "Lessons Learned from Acquisition of Modified Commercial Items and Nondevelopmental Items."

Once the decision is made to use commercial items and NDI in the acquisition, the T&E community needs to provide updated versions of the TEMP, requests for funding, and any life cycle implications to the program manager. Above all, test risks need to be continually evaluated and mitigation plans put into place.

Not a Panacea

Developing acquisition strategies that include commercial items and NDI is not a panacea for not testing the items. As with any acquisition, some associated risks remain. These risks need to be carefully analyzed and mitigated to reap the benefits that the use of commercial items and NDI can produce. Early and continued involvement of the T&E community will ensure that their concerns are heard, accounted for, and acted upon.

As the program manager, you now have tools available to understand the T&E benefits and risks of using commercial items and NDI. Choose wisely.

Editor's Note: The author welcomes questions or comments on this article. Contact Mangum at *holly.mangum@ellsworth.af.mil*.

FROM THE DIRECTOR
Defense Acquisition Regulations (DAR) Council

The controversial "Contractor Responsibility" rule was revoked in Federal Acquisition Circular (FAC) 2001-003, published in the *Federal Register* on Dec. 27, 2001 (see *http://www.arnet.gov/far/facsframe.html*). This rule would have required contracting officers to consider a company's satisfactory compliance with tax, labor and employment, environmental, antitrust, and consumer protection laws before awarding a contract; and would have required contractors to certify whether they violated such laws within the preceding three years. After review of the public comments, the Federal Acquisition Regulatory (FAR) Council, which fully supports the intent of the proposed rule, determined it should be revoked because: 1) a convincing case had not been presented that contracting officers were awarding contracts to other than responsible contractors; and 2) the rule was not justified from a cost-benefit perspective nor did it provide sufficient training or guidelines to prevent arbitrary or otherwise abusive implementation. For questions or further information on revocation of the "Contractor Responsibility" rule, contact Amy Williams in the Defense Procurement DAR Directorate at (703) 602-0288.